

(12) **United States Patent**  
**Yan et al.**

(10) **Patent No.:** **US 9,510,459 B2**  
(45) **Date of Patent:** **Nov. 29, 2016**

(54) **ENVIRONMENTAL SENSITIVE  
ELECTRONIC DEVICE PACKAGE AND  
MANUFACTURING METHOD THEREOF**

(71) Applicant: **Industrial Technology Research  
Institute, Hsinchu (TW)**

(72) Inventors: **Jing-Yi Yan**, Hsinchu County (TW);  
**Shu-Tang Yeh**, Taichung (TW);  
**Sheng-Wei Chen**, Kinmen County  
(TW); **Kuang-Jung Chen**, Hsinchu  
(TW)

(73) Assignee: **Industrial Technology Research  
Institute, Hsinchu (TW)**

(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 275 days.

(21) Appl. No.: **14/098,551**

(22) Filed: **Dec. 6, 2013**

(65) **Prior Publication Data**  
US 2014/0160710 A1 Jun. 12, 2014

#### Related U.S. Application Data

(60) Provisional application No. 61/733,907, filed on Dec.  
6, 2012.

#### Foreign Application Priority Data

Sep. 4, 2013 (TW) ..... 102131813 A

(51) **Int. Cl.**  
**H05K 3/30** (2006.01)  
**H01L 51/52** (2006.01)  
**G02F 1/1333** (2006.01)

(52) **U.S. Cl.**  
CPC ..... **H05K 3/30** (2013.01); **G02F 1/133308**  
(2013.01); **H01L 51/5246** (2013.01);

(Continued)

#### (58) Field of Classification Search

CPC ..... H05H 1/141–1/144; H05K 3/429;  
H01L 2924/01079  
USPC ..... 361/782–784, 792; 174/250–259  
See application file for complete search history.

#### (56) References Cited

##### U.S. PATENT DOCUMENTS

6,576,351 B2 6/2003 Silvernail  
6,998,776 B2 2/2006 Aitken et al.

(Continued)

##### FOREIGN PATENT DOCUMENTS

CN 1867217 11/2006  
CN 101009303 8/2007

(Continued)

##### OTHER PUBLICATIONS

“Office Action of Taiwan Counterpart Application”, issued on Oct.  
8, 2015, p. 1-p. 4.

(Continued)

*Primary Examiner* — Tuan T Dinh

(74) *Attorney, Agent, or Firm* — Jianq Chyun IP Office

(57)

#### ABSTRACT

An environmental sensitive electronic device package including a first substrate, a second substrate, an environmental sensitive electronic device, a side wall barrier structure, a first adhesive, and a second adhesive is provided. The environmental sensitive electronic device is located on the first substrate. The first adhesive is located on the first substrate. The side wall barrier structure is located on the first adhesive, and the side wall barrier structure is adhered to the first substrate through the first adhesive. The second adhesive is located on the side wall barrier structure. The side wall barrier structure is adhered to the second substrate through the second adhesive, and the side wall barrier structure, the first adhesive, and the second adhesive are located between the first substrate and the second substrate. A manufacturing method of an environmental sensitive electronic device package is also provided.

**34 Claims, 18 Drawing Sheets**

